

February 12, 2013

RECEIVED

FEB 13 2013

Mr. Jason Gunter  
Remedial Project Manager  
U.S. Environmental Protection Agency  
Region 7 - Superfund Branch  
901 North 5<sup>th</sup> Street  
Kansas City, KS 66101

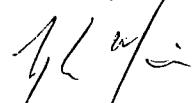
SUPERFUND DIVISION

**Re: The Doe Run Company – Elvins/Rivermines Mine Tailings Site Monthly Progress Report**

Dear Mr. Gunter:

As required by Article VI, Section 56 of the Unilateral Administrative Order (UAO) (CERCLA-07-2005-0169) for the referenced project and on behalf of The Doe Run Company, the progress report for the period January 1, 2013 through January 31, 2013 is enclosed. If you have any questions or comments, please call me at 573-638-5020 or Mark Nations at 573-518-0800.

Sincerely,



Ty L. Morris, P.E., R.G.  
Vice President

TLM/jms  
Enclosures  
c: Mark Nations – TDRC  
Matt Wohl – TDRC (electronic only)  
Kathy Rangen – MDNR  
Tim Skoglund – Barr Engineering

07CR

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Superfund

DU02

**Elvins/Rivermines Mine Tailings Site**  
Park Hills, Missouri  
**Removal Action - Monthly Progress Report**  
Period: January 1, 2013 – January 31, 2013

**1. Actions Performed and Problems Encountered This Period:**

- a. Continued operating the roughing filter during the period and divert flow around the ZVI/sand filter, aeration tank, and final sand filter.
- b. Continued to take analytical samples from the pilot test roughing filter (RMP-Rough) during the period. Samples were taken two to three times a week. These samples were taken from the bypass pipe except for the sampling event on January 9, 2013, when the sample was taken from the standpipe siphon hose. Analytical results are described below and included with this progress report.
- c. Continued to have head loss issues within the roughing filter and its associated piping system. This is primarily occurring as a result of the metal sulfides that have been deposited in the system as a result of the treatment process. During the month of January, head losses due to metal sulfide deposits seemed to increase slightly.
- d. Planning for renovations to the iron filter and aeration tank were completed and submitted to Doe Run for review. The proposed renovations include retrofitting the ZVI/sand filter (square tank) with iron rebar using the aeration tank as a settling basin.
- e. Vandalism occurred at the pilot test during the weekend of January 25 – 27, 2013. This included dropping a bucket into the seepage pond outlet, placing a manhole cover over the seepage pond outlet, inserting a tarp and other debris into the manhole that directs flow to the treatment cells, and damaging the pipe directing flow to the test pilot from the seepage pond. Flow was restored on January 28, 2013.
- f. Work continued on the task of rehabilitating the western treatment pond. This work focused on allowing the saturated media to activate. As part of the media activation process, the flow has been progressively increased and will be increased further over the next several months.

**2. Analytical Data and Results Received This Period:**

- a. Dissolved zinc levels in the pilot effluent test ranged between 7.735 mg/L and 11.19 mg/L.
- b. Total zinc levels in the pilot test effluent ranged between 9.32 mg/L and 13.08 mg/L.
- c. Iron concentrations in the pilot test effluent ranged between 1.05 mg/L and 3.00 mg/L.
- d. Total suspended solids concentrations in the system effluent were not measured this period.
- e. During this period, water samples were collected from just upstream of Old Missouri Highway 32, as well as from upstream and downstream of the confluence of the site discharge with Flat River. The analytical results for this event are included in this progress report.
- f. During this period, the Ambient Air Monitoring Report for Third Quarter 2012 and October 2012 were completed. Any issues identified in these reports are discussed below. A copy of these documents has been sent to your attention.

The Third Quarter 2012 Ambient Air Monitoring Report noted the following:

- The action levels for lead and dust were not exceeded.
- No samples were taken with the Rivermines #3 (Water Treatment Plant) TSP monitor on 07/02/12 due to mechanical failure. Upon discovery, the issue was corrected.
- No samples were taken with the TSP monitors on 07/04/12 due to the holiday.

- A QA filter blank was completed on the Rivermines #1 (Office) TSP and PM<sub>10</sub> monitors on 08/30/12.
- No samples were taken with the TSP and PM<sub>10</sub> monitors on 09/03/12 due to the holiday.
- No samples were taken with the Big River #4 (Primary) PM<sub>10</sub> monitor on 09/21/12 due to mechanical failure. Upon discovery, the issue was corrected.
- No samples were taken with the Rivermines #1 (Office) TSP and PM<sub>10</sub> monitors on 09/27/12 due to electrical issues caused by the weather. Upon discovery, the issue was corrected.
- There was a QA blank filter associated with the Rivermines #2 (North) TSP and PM<sub>10</sub> monitors on 09/28/12.

The October 2012 Ambient Air Monitoring Report noted the following:

- The action levels for lead and dust were not exceeded.
- No sample was taken with the Big River #4 (Primary) PM<sub>10</sub> monitor on 10/09/12 due to mechanical failure of the elapsed time indicator. Upon discovery, the issue was corrected.

**3. Developments Anticipated and Work Scheduled for Next Period:**

- a. Continue analytical sampling and field measurements three times a week. No WET tests are planned.
- b. Continue to operate the system with the bypass pipe, until renovations described in part (e) are complete.
- c. Complete monthly water sampling activities as described in the Removal Action Work Plan.
- d. Complete air monitoring activities as described in the Removal Action Work Plan.
- e. Retrofit the dormant ZVI/sand filter to contain a layer of sand topped with a thinner layer of pea gravel, with iron rebar inserted through both layers. Renovations will also include additional piping and tank modifications to allow for horizontal flow through the pea gravel layer, directed by baffles, to increase contact time with the iron rebar.
- f. Continue progressively increasing the flow rate over the next several months and monitoring the system to see that the hydraulics are working properly.

**4. Changes in Personnel:**

- a. None.

**5. Issues or Problems Arising This Period:**

- a. None.

**6. Resolution of Issues or Problems Arising This Period:**

- a. None.

**End of Monthly Progress Report**

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January 17, 2013

Andrea Nord  
Barr Engineering Company  
1001 Diamond Ridge  
Suite 1100  
Jefferson City, MO 65109  
TEL: (888) 324-3933  
FAX: (573) 638-5001



**RE:** Rivermines NPDES

**WorkOrder:** 13010451

Dear Andrea Nord:

TEKLAB, INC received 4 samples on 1/10/2013 11:27:00 AM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,



Michael L. Austin  
Project Manager  
(618)344-1004 ex 16  
MAustin@teklabinc.com



## Report Contents

<http://www.teklabinc.com/>

**Client:** Barr Engineering Company

**Work Order:** 13010451

**Client Project:** Rivermines NPDES

**Report Date:** 17-Jan-13

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This reporting package includes the following:

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## Definitions

<http://www.teklabinc.com/>

**Client:** Barr Engineering Company

**Work Order:** 13010451

**Client Project:** Rivermines NPDES

**Report Date:** 17-Jan-13

### Abbr Definition

CCV Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.

DF Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilutions factors.

DNI Did not ignite

DUP Laboratory duplicate is an aliquot of a sample taken from the same container under laboratory conditions for independent processing and analysis independently of the original aliquot.

ICV Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.

IDPH IL Dept. of Public Health

LCS Laboratory control sample, spiked with verified known amounts of analytes, is analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system. The acceptable recovery range is in the QC Package (provided upon request).

LCSD Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).

MB Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.

MDL Method detection limit means the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

MS Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).

MSD Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).

MW Molecular weight

ND Not Detected at the Reporting Limit

NELAP NELAP Accredited

PQL Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions. The acceptable recovery range is listed in the QC Package (provided upon request).

RL The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.

RPD Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).

SPK The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.

Surr Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.

TNTC Too numerous to count (> 200 CFU)

### Qualifiers

# - Unknown hydrocarbon

B - Analyte detected in associated Method Blank

E - Value above quantitation range

H - Holding times exceeded

M - Manual Integration used to determine area response

ND - Not Detected at the Reporting Limit

R - RPD outside accepted recovery limits

S - Spike Recovery outside recovery limits

X - Value exceeds Maximum Contaminant Level



## Case Narrative

<http://www.teklabinc.com/>

**Client:** Barr Engineering Company

**Client Project:** Rivermines NPDES

**Work Order:** 13010451

**Report Date:** 17-Jan-13

**Cooler Receipt Temp:** 1.2 °C

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### Locations and Accreditations

Collinsville		Springfield		Kansas City	
Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425	Address	3920 Pintail Dr Springfield, IL 62711-9415	Address	8421 Nieman Road Lenexa, KS 66214
Phone	(618) 344-1004	Phone	(217) 698-1004	Phone	(913) 541-1998
Fax	(618) 344-1005	Fax	(217) 698-1005	Fax	(913) 541-1998
Email	jhriley@teklabinc.com	Email	KKlostermann@teklabinc.com	Email	dthompson@teklabinc.com

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2014	Collinsville
Kansas	KDHE	E-10374	NELAP	1/31/2013	Collinsville
Louisiana	LDEQ	166493	NELAP	6/30/2013	Collinsville
Louisiana	LDEQ	166578	NELAP	6/30/2013	Springfield
Texas	TCEQ	T104704515-12-1	NELAP	7/31/2013	Collinsville
Arkansas	ADEQ	88-0966		3/14/2013	Collinsville
Illinois	IDPH	17584		4/30/2013	Collinsville
Kentucky	UST	0073		5/26/2013	Collinsville
Missouri	MDNR	00930		4/13/2013	Collinsville
Oklahoma	ODEQ	9978		8/31/2013	Collinsville

# Laboratory Results

<http://www.teklabinc.com/>

Client: Barr Engineering Company

Work Order: 13010451

Client Project: Rivermines NPDES

Report Date: 17-Jan-13

Lab ID: 13010451-001

Client Sample ID: RM-001

Matrix: AQUEOUS

Collection Date: 01/09/2013 13:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
<b>EPA 600 375.2 REV 2.0 1993 (TOTAL)</b>								
Sulfate	NELAP	500		833	mg/L	50	01/14/2013 14:44	R172601
<b>STANDARD METHOD 4500-H B, LABORATORY ANALYZED</b>								
Lab pH	NELAP	1.00		7.61		1	01/10/2013 15:48	R172448
<b>STANDARD METHODS 2340 C</b>								
Hardness, as ( CaCO <sub>3</sub> )	NELAP	5		1190	mg/L	1	01/10/2013 13:12	R172464
<b>STANDARD METHODS 2540 D</b>								
Total Suspended Solids	NELAP	6		< 6	mg/L	1	01/10/2013 16:18	R172466
<b>STANDARD METHODS 2540 F</b>								
Solids, Settleable	NELAP	0.1		< 0.1	ml/L	1	01/10/2013 15:00	R172471
<b>STANDARD METHODS 5310 C, ORGANIC CARBON</b>								
Total Organic Carbon (TOC)	NELAP	1.0		2.6	mg/L	1	01/11/2013 18:51	R172542
<b>EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)</b>								
Cadmium	NELAP	2.00		6.60	µg/L	1	01/11/2013 12:55	84837
Zinc	NELAP	10.0	S	12200	µg/L	1	01/11/2013 12:55	84837
<i>MS QC limits for Zn are not applicable due to high sample/spike ratio.</i>								
<b>EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)</b>								
Cadmium	NELAP	2.00		8.10	µg/L	1	01/11/2013 16:45	84836
Zinc	NELAP	10.0	S	12300	µg/L	1	01/11/2013 16:45	84836
<i>MS QC limits for Zn are not applicable due to high sample/spike ratio.</i>								
<b>STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA</b>								
Lead	NELAP	2.00	X	6.43	µg/L	1	01/11/2013 11:07	84827
<b>STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)</b>								
Lead	NELAP	2.00	X	5.70	µg/L	1	01/11/2013 13:39	84838

## Laboratory Results

<http://www.teklabinc.com/>
**Client:** Barr Engineering Company

**Work Order:** 13010451

**Client Project:** Rivermines NPDES

**Report Date:** 17-Jan-13

**Lab ID:** 13010451-002

**Client Sample ID:** RM-US

**Matrix:** AQUEOUS

**Collection Date:** 01/09/2013 13:35

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
<b>EPA 600 375.2 REV 2.0 1993 (TOTAL)</b>								
Sulfate	NELAP	20		38	mg/L	2	01/14/2013 15:00	R172601
<b>STANDARD METHOD 4500-H B, LABORATORY ANALYZED</b>								
Lab pH	NELAP	1.00		8.60		1	01/10/2013 15:50	R172448
<b>STANDARD METHODS 2340 C</b>								
Hardness, as ( CaCO <sub>3</sub> )	NELAP	5		240	mg/L	1	01/10/2013 13:12	R172464
<b>STANDARD METHODS 2540 D</b>								
Total Suspended Solids	NELAP	6		< 6	mg/L	1	01/10/2013 16:18	R172466
<b>STANDARD METHODS 5310 C, ORGANIC CARBON</b>								
Total Organic Carbon (TOC)	NELAP	1.0		1.7	mg/L	1	01/11/2013 19:42	R172542
<b>EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)</b>								
Cadmium	NELAP	2.00		< 2.00	µg/L	1	01/11/2013 13:06	84837
Zinc	NELAP	10.0		< 10.0	µg/L	1	01/11/2013 13:06	84837
<b>EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)</b>								
Cadmium	NELAP	2.00		< 2.00	µg/L	1	01/11/2013 17:03	84836
Zinc	NELAP	10.0		< 10.0	µg/L	1	01/11/2013 17:03	84836
<b>STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA</b>								
Lead	NELAP	2.00		< 2.00	µg/L	1	01/11/2013 10:26	84827
<b>STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)</b>								
Lead	NELAP	2.00		< 2.00	µg/L	1	01/11/2013 13:43	84838



## Laboratory Results

<http://www.teklabinc.com/>

Client: Barr Engineering Company

Work Order: 13010451

Client Project: Rivermines NPDES

Report Date: 17-Jan-13

Lab ID: 13010451-003

Client Sample ID: RM-DS

Matrix: AQUEOUS

Collection Date: 01/09/2013 12:35

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
<b>EPA 600 375.2 REV 2.0 1993 (TOTAL)</b>								
Sulfate	NELAP	50		118	mg/L	5	01/16/2013 16:04	R172688
<b>STANDARD METHOD 4500-H B, LABORATORY ANALYZED</b>								
Lab pH	NELAP	1.00		8.35		1	01/10/2013 15:52	R172448
<b>STANDARD METHODS 2340 C</b>								
Hardness, as ( CaCO <sub>3</sub> )	NELAP	5		290	mg/L	1	01/10/2013 13:12	R172464
<b>STANDARD METHODS 2540 D</b>								
Total Suspended Solids	NELAP	6		< 6	mg/L	1	01/10/2013 16:18	R172466
<b>STANDARD METHODS 5310 C, ORGANIC CARBON</b>								
Total Organic Carbon (TOC)	NELAP	1.0		2.0	mg/L	1	01/11/2013 19:48	R172542
<b>EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)</b>								
Cadmium	NELAP	2.00		< 2.00	µg/L	1	01/11/2013 13:09	84837
Zinc	NELAP	10.0		917	µg/L	1	01/11/2013 13:09	84837
<b>EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)</b>								
Cadmium	NELAP	2.00		< 2.00	µg/L	1	01/11/2013 17:09	84836
Zinc	NELAP	10.0		972	µg/L	1	01/11/2013 17:09	84836
<b>STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA</b>								
Lead	NELAP	2.00		< 2.00	µg/L	1	01/11/2013 10:43	84827
<b>STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)</b>								
Lead	NELAP	2.00		< 2.00	µg/L	1	01/11/2013 13:53	84838



## Laboratory Results

<http://www.teklabinc.com/>

Client: Barr Engineering Company

Work Order: 13010451

Client Project: Rivermines NPDES

Report Date: 17-Jan-13

Lab ID: 13010451-004

Client Sample ID: RM-DUP

Matrix: AQUEOUS

Collection Date: 01/09/2013 0:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
<b>EPA 600 375.2 REV 2.0 1993 (TOTAL)</b>								
Sulfate	NELAP	50		129	mg/L	5	01/15/2013 18:47	R172656
<b>STANDARD METHOD 4500-H B, LABORATORY ANALYZED</b>								
Lab pH	NELAP	1.00		8.34		1	01/10/2013 15:54	R172448
<b>STANDARD METHODS 2340 C</b>								
Hardness, as ( CaCO <sub>3</sub> )	NELAP	5		290	mg/L	1	01/10/2013 13:12	R172464
<b>STANDARD METHODS 2540 D</b>								
Total Suspended Solids	NELAP	6		< 6	mg/L	1	01/10/2013 16:27	R172466
<b>STANDARD METHODS 5310 C, ORGANIC CARBON</b>								
Total Organic Carbon (TOC)	NELAP	1.0		1.9	mg/L	1	01/11/2013 19:55	R172542
<b>EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)</b>								
Cadmium	NELAP	2.00		< 2.00	µg/L	1	01/11/2013 13:13	84837
Zinc	NELAP	10.0		900	µg/L	1	01/11/2013 13:13	84837
<b>EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)</b>								
Cadmium	NELAP	2.00		< 2.00	µg/L	1	01/11/2013 17:15	84836
Zinc	NELAP	10.0		982	µg/L	1	01/11/2013 17:15	84836
<b>STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA</b>								
Lead	NELAP	2.00		< 2.00	µg/L	1	01/11/2013 10:47	84827
<b>STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)</b>								
Lead	NELAP	2.00		< 2.00	µg/L	1	01/11/2013 13:56	84838



## Sample Summary

<http://www.teklabinc.com/>

**Client:** Barr Engineering Company

**Work Order:** 13010451

**Client Project:** Rivermines NPDES

**Report Date:** 17-Jan-13

Lab Sample ID	Client Sample ID	Matrix	Fractions	Collection Date
13010451-001	RM-001	Aqueous	5	01/09/2013 13:00
13010451-002	RM-US	Aqueous	5	01/09/2013 13:35
13010451-003	RM-DS	Aqueous	5	01/09/2013 12:35
13010451-004	RM-DUP	Aqueous	5	01/09/2013 0:00



## Dates Report

<http://www.teklabinc.com/>

**Client:** Barr Engineering Company

**Work Order:** 13010451

**Client Project:** Rivermines NPDES

**Report Date:** 17-Jan-13

Sample ID	Client Sample ID	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	Test Name				
13010451-001A	RM-001	01/09/2013 13:00	01/10/2013 11:27		
	Standard Methods 2540 F				01/10/2013 15:00
13010451-001B	RM-001	01/09/2013 13:00	01/10/2013 11:27		
	EPA 600 375.2 Rev 2.0 1993 (Total)				01/14/2013 14:44
	Standard Method 4500-H B, Laboratory Analyzed				01/10/2013 15:48
	Standard Methods 2340 C				01/10/2013 13:12
	Standard Methods 2540 D				01/10/2013 16:18
13010451-001C	RM-001	01/09/2013 13:00	01/10/2013 11:27		
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)			01/10/2013 17:58	01/11/2013 16:45
	Standard Methods 3030 E, 3113 B, Metals by GFAA			01/10/2013 15:09	01/11/2013 11:07
13010451-001D	RM-001	01/09/2013 13:00	01/10/2013 11:27		
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)			01/10/2013 18:29	01/11/2013 12:55
	Standard Methods 3030 B, 3113 B, Metals by GFAA (Dissolved)			01/10/2013 19:28	01/11/2013 13:39
13010451-001E	RM-001	01/09/2013 13:00	01/10/2013 11:27		
	Standard Methods 5310 C, Organic Carbon				01/11/2013 18:51
13010451-002A	RM-US	01/09/2013 13:35	01/10/2013 11:27		
	Standard Method 4500-H B, Laboratory Analyzed				01/10/2013 15:50
	Standard Methods 2540 D				01/10/2013 16:18
13010451-002B	RM-US	01/09/2013 13:35	01/10/2013 11:27		
	EPA 600 375.2 Rev 2.0 1993 (Total)				01/14/2013 15:00
	Standard Methods 2340 C				01/10/2013 13:12
13010451-002C	RM-US	01/09/2013 13:35	01/10/2013 11:27		
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)			01/10/2013 17:58	01/11/2013 17:03
	Standard Methods 3030 E, 3113 B, Metals by GFAA			01/10/2013 15:09	01/11/2013 10:26
13010451-002D	RM-US	01/09/2013 13:35	01/10/2013 11:27		
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)			01/10/2013 18:29	01/11/2013 13:06
	Standard Methods 3030 B, 3113 B, Metals by GFAA (Dissolved)			01/10/2013 19:28	01/11/2013 13:43
13010451-002E	RM-US	01/09/2013 13:35	01/10/2013 11:27		
	Standard Methods 5310 C, Organic Carbon				01/11/2013 19:42
13010451-003A	RM-DS	01/09/2013 12:35	01/10/2013 11:27		
	Standard Method 4500-H B, Laboratory Analyzed				01/10/2013 15:52
	Standard Methods 2540 D				01/10/2013 16:18
13010451-003B	RM-DS	01/09/2013 12:35	01/10/2013 11:27		
	EPA 600 375.2 Rev 2.0 1993 (Total)				01/16/2013 16:04
	Standard Methods 2340 C				01/10/2013 13:12
13010451-003C	RM-DS	01/09/2013 12:35	01/10/2013 11:27		



## Dates Report

<http://www.teklabinc.com/>

**Client:** Barr Engineering Company

**Work Order:** 13010451

**Client Project:** Rivermines NPDES

**Report Date:** 17-Jan-13

Sample ID	Client Sample ID	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	Test Name				
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)			01/10/2013 17:58	01/11/2013 17:09
	Standard Methods 3030 E, 3113 B, Metals by GFAA			01/10/2013 15:09	01/11/2013 10:43
13010451-003D	RM-DS	01/09/2013 12:35	01/10/2013 11:27		
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)			01/10/2013 18:29	01/11/2013 13:09
	Standard Methods 3030 B, 3113 B, Metals by GFAA (Dissolved)			01/10/2013 19:28	01/11/2013 13:53
13010451-003E	RM-DS	01/09/2013 12:35	01/10/2013 11:27		
	Standard Methods 5310 C, Organic Carbon				01/11/2013 19:48
13010451-004A	RM-DUP	01/09/2013 0:00	01/10/2013 11:27		
	Standard Method 4500-H B, Laboratory Analyzed				01/10/2013 15:54
	Standard Methods 2540 D				01/10/2013 16:27
13010451-004B	RM-DUP	01/09/2013 0:00	01/10/2013 11:27		
	EPA 600 375.2 Rev 2.0 1993 (Total)				01/15/2013 18:47
	Standard Methods 2340 C				01/10/2013 13:12
13010451-004C	RM-DUP	01/09/2013 0:00	01/10/2013 11:27		
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)			01/10/2013 17:58	01/11/2013 17:15
	Standard Methods 3030 E, 3113 B, Metals by GFAA			01/10/2013 15:09	01/11/2013 10:47
13010451-004D	RM-DUP	01/09/2013 0:00	01/10/2013 11:27		
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)			01/10/2013 18:29	01/11/2013 13:13
	Standard Methods 3030 B, 3113 B, Metals by GFAA (Dissolved)			01/10/2013 19:28	01/11/2013 13:56
13010451-004E	RM-DUP	01/09/2013 0:00	01/10/2013 11:27		
	Standard Methods 5310 C, Organic Carbon				01/11/2013 19:55



## Quality Control Results

<http://www.teklabinc.com/>

**Client:** Barr Engineering Company

**Work Order:** 13010451

**Client Project:** Rivermines NPDES

**Report Date:** 17-Jan-13

### EPA 600 375.2 REV 2.0 1993 (TOTAL)

Batch R172601 SampType: MBLK		Units mg/L		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
SampID: MBLK														
Sulfate		10					< 10							01/14/2013
Batch R172601 SampType: LCS		Units mg/L		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
SampID: LCS														01/14/2013
Sulfate		10					20	20	0	100.0	90	110		01/14/2013
Batch R172656 SampType: MBLK		Units mg/L		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
SampID: MBLK														01/15/2013
Sulfate		10					< 10							01/15/2013
Batch R172656 SampType: LCS		Units mg/L		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
SampID: LCS														01/15/2013
Sulfate		10					21	20	0	105.0	90	110		01/15/2013
Batch R172656 SampType: MS		Units mg/L		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
SampID: 13010451-004BMS														01/15/2013
Sulfate		50					175	50	129.4	90.8	90	110		01/15/2013
Batch R172656 SampType: MSD		Units mg/L		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed	
SampID: 13010451-004BMSD														01/15/2013
Sulfate		50					178	50	129.4	96.5	174.8	1.62		01/15/2013
Batch R172688 SampType: MBLK		Units mg/L		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
SampID: MBLK														01/16/2013
Sulfate		10					< 10							01/16/2013
Batch R172688 SampType: LCS		Units mg/L		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
SampID: LCS														01/16/2013
Sulfate		10					20	20	0	100.8	90	110		01/16/2013



## Quality Control Results

<http://www.teklabinc.com/>

**Client:** Barr Engineering Company

**Work Order:** 13010451

**Client Project:** Rivermines NPDES

**Report Date:** 17-Jan-13

### STANDARD METHOD 4500-H B, LABORATORY ANALYZED

Batch	SampType:	Units							Date Analyzed		
Analyses			RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	
Lab pH		1.00			7.03	7.00	0	100.4	99.1	100.8	01/10/2013
<b>Batch R172448 SampType: DUP</b> Units RPD Limit 10											
SampID:	13010451-001BDUP										
Analyses			RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH		1.00			7.60				7.610	0.13	01/10/2013
<b>Batch R172448 SampType: DUP</b> Units RPD Limit 10											
SampID:	13010451-002ADUP										
Analyses			RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH		1.00			8.63				8.600	0.35	01/10/2013
<b>Batch R172448 SampType: DUP</b> Units RPD Limit 10											
SampID:	13010451-003ADUP										
Analyses			RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH		1.00			8.34				8.350	0.12	01/10/2013
<b>Batch R172448 SampType: DUP</b> Units RPD Limit 10											
SampID:	13010451-004ADUP										
Analyses			RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH		1.00			8.32				8.340	0.24	01/10/2013

### STANDARD METHODS 2340 C

Batch	SampType:	Units mg/L							Date Analyzed		
Analyses			RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	
Hardness, as ( CaCO <sub>3</sub> )		5			< 5						01/10/2013
<b>Batch R172464 SampType: LCS</b> Units mg/L											
SampID:	LCS-R172464										
Analyses			RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Hardness, as ( CaCO <sub>3</sub> )		5			980	1000	0	98.0	90	110	01/10/2013
<b>Batch R172464 SampType: MS</b> Units mg/L											
SampID:	13010451-004BMS										
Analyses			RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Hardness, as ( CaCO <sub>3</sub> )		5			490	200	290.0	100.0	85	115	01/10/2013



## Quality Control Results

<http://www.teklabinc.com/>

Client: Barr Engineering Company

Work Order: 13010451

Client Project: Rivermines NPDES

Report Date: 17-Jan-13

### STANDARD METHODS 2340 C

Batch	R172464	SampType:	MSD	Units	mg/L				RPD Limit	10	Date	Analyzed
SampID:	13010451-004BMSD											
Analyses				RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	
Hardness, as ( CaCO <sub>3</sub> )				5		500	200	290.0	105.0	490.0	2.02	01/10/2013

### STANDARD METHODS 2540 D

Batch	R172466	SampType:	MBLK	Units	mg/L				Low Limit	High Limit	Date	Analyzed
SampID:	MBLK											
Analyses				RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	
Total Suspended Solids				6		< 6						01/10/2013

### Batch R172466 SampType: LCS

Batch	R172466	SampType:	LCS	Units	mg/L				Low Limit	High Limit	Date	Analyzed
SampID:	LCS											
Analyses				RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	
Total Suspended Solids				6		92	100	0	92.0	85	115	01/10/2013
Total Suspended Solids				6		102	100	0	102.0	85	115	01/10/2013
Total Suspended Solids				6		107	100	0	107.0	85	115	01/10/2013
Total Suspended Solids				6		88	100	0	88.0	85	115	01/10/2013

### Batch R172466 SampType: DUP

Batch	R172466	SampType:	DUP	Units	mg/L				RPD Limit	15	Date	Analyzed
SampID:	13010451-004A DUP											
Analyses				RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	
Total Suspended Solids				6		< 6				0	0.00	01/10/2013

### STANDARD METHODS 5310 C, ORGANIC CARBON

Batch	R172542	SampType:	MBLK	Units	mg/L				Low Limit	High Limit	Date	Analyzed
SampID:	ICB/MBLK											
Analyses				RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	
Total Organic Carbon (TOC)				1.0		< 1.0						01/11/2013

### Batch R172542 SampType: LCS

Batch	R172542	SampType:	LCS	Units	mg/L				Low Limit	High Limit	Date	Analyzed
SampID:	ICV/LCS											
Analyses				RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	
Total Organic Carbon (TOC)				10.0		61.0	59.7	0	102.1	90	110	01/11/2013

### Batch R172542 SampType: MS

Batch	R172542	SampType:	MS	Units	mg/L				Low Limit	High Limit	Date	Analyzed
SampID:	13010451-001EMS											
Analyses				RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	
Total Organic Carbon (TOC)				1.0		7.0	5.0	2.580	89.4	85	115	01/11/2013

### Batch R172542 SampType: MSD

Batch	R172542	SampType:	MSD	Units	mg/L				RPD Limit	10	Date	Analyzed
SampID:	13010451-001EMSD											
Analyses				RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	
Total Organic Carbon (TOC)				1.0		7.1	5.0	2.580	90.2	7.050	0.57	01/11/2013



## Quality Control Results

<http://www.teklabinc.com/>

Client: Barr Engineering Company

Work Order: 13010451

Client Project: Rivermines NPDES

Report Date: 17-Jan-13

### EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)

Batch 84837 SampType: MBLK		Units µg/L								
Analyses		RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium		2.00		< 2.00	2.00	0	0	-100	100	01/11/2013
Zinc		10.0		< 10.0	10.0	0	0	-100	100	01/11/2013
Batch 84837 SampType: LCS										Date Analyzed
Analyses		RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	
Cadmium		2.00		44.2	50.0	0	88.4	85	115	01/11/2013
Zinc		10.0		446	500	0	89.1	85	115	01/11/2013
Batch 84837 SampType: MS										Date Analyzed
Analyses		RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	
Cadmium		2.00		49.7	50.0	6.6	86.2	75	125	01/11/2013
Zinc		10.0	S	12600	500	12230	68.0	75	125	01/11/2013
Batch 84837 SampType: MSD								RPD Limit 20		Date Analyzed
Analyses		RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	
Cadmium		2.00		48.7	50.0	6.6	84.2	49.7	2.03	01/11/2013
Zinc		10.0	S	12300	500	12230	6.0	12570	2.50	01/11/2013

### EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)

Batch 84836 SampType: MBLK		Units µg/L								
Analyses		RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium		2.00		< 2.00	2.00	0	0	-100	100	01/11/2013
Zinc		10.0		< 10.0	10.0	0	0	-100	100	01/11/2013
Batch 84836 SampType: LCS										Date Analyzed
Analyses		RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	
Cadmium		2.00		47.3	50.0	0	94.6	85	115	01/11/2013
Zinc		10.0		481	500	0	96.2	85	115	01/11/2013
Batch 84836 SampType: MS										Date Analyzed
Analyses		RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	
Cadmium		2.00		50.2	50.0	8.1	84.2	75	125	01/11/2013
Zinc		10.0		12700	500	12290	86.0	75	125	01/11/2013



## Quality Control Results

<http://www.teklabinc.com/>

Client: Barr Engineering Company

Work Order: 13010451

Client Project: Rivermines NPDES

Report Date: 17-Jan-13

### EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)

Batch	84836	SampType:	MSD	Units	µg/L	RPD Limit 20				Date
SamplID: 13010451-001CMSD										
Analyses		RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Analyzed
Cadmium		2.00		50.7	50.0	8.1	85.2	50.2	0.99	01/11/2013
Zinc		10.0	S	12600	500	12290	58.0	12720	1.11	01/11/2013

### STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA

Batch	84827	SampType:	MBLK	Units	µg/L	RPD Limit 20				Date
SamplID: MB-84827										
Analyses		RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Analyzed
Lead		2.00		< 2.00	2.00	0	0	-100	100	01/11/2013

### Batch 84827 SampType: LCS Units µg/L

SamplID:	LCS-84827 <th data-cs="4" data-kind="parent">RPD Limit 20</th> <th data-kind="ghost"></th> <th data-kind="ghost"></th> <th data-kind="ghost"></th> <th>Date</th>	RPD Limit 20				Date
Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC
Lead	2.00		14.8	15.0	0	98.9

### Batch 84827 SampType: MS Units µg/L

SamplID:	13010451-002CMS <th data-cs="4" data-kind="parent">RPD Limit 20</th> <th data-kind="ghost"></th> <th data-kind="ghost"></th> <th data-kind="ghost"></th> <th>Date</th>	RPD Limit 20				Date
Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC
Lead	2.00		15.2	15.0	0.5136	98.2

### Batch 84827 SampType: MSL Units µg/L

SamplID:	13010451-002CMSD <th data-cs="4" data-kind="parent">RPD Limit 20</th> <th data-kind="ghost"></th> <th data-kind="ghost"></th> <th data-kind="ghost"></th> <th>Date</th>	RPD Limit 20				Date
Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC
Lead	2.00		15.5	15.0	0.5136	99.6

### STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)

Batch	84838	SampType:	MBLK	Units	µg/L	RPD Limit 20				Date
SamplID: MB-84838										
Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD
Lead	2.00		< 2.00	2.00	0	0	-100	100	15.2462	1.36

### Batch 84838 SampType: LCS Units µg/L

SamplID:	LCS-84838 <th data-cs="4" data-kind="parent">RPD Limit 20</th> <th data-kind="ghost"></th> <th data-kind="ghost"></th> <th data-kind="ghost"></th> <th>Date</th>	RPD Limit 20				Date
Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC
Lead	2.00		13.9	15.0	0	92.8

### Batch 84838 SampType: MS Units µg/L

SamplID:	13010451-002DMS <th data-cs="4" data-kind="parent">RPD Limit 20</th> <th data-kind="ghost"></th> <th data-kind="ghost"></th> <th data-kind="ghost"></th> <th>Date</th>	RPD Limit 20				Date
Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC
Lead	2.00		14.3	15.0	0.873	89.6



## Quality Control Results

<http://www.teklabinc.com/>

Client: Barr Engineering Company

Work Order: 13010451

Client Project: Rivermines NPDES

Report Date: 17-Jan-13

---

### STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)

---

Analyses	Batch	SampType:	Units	RPD Limit	Date Analyzed
	84838	MSD	µg/L	20	
Lead		SampID: 13010451-002DMSD	RL	SPK Ref Val %REC	RPD Ref Val %RPD
			2.00	14.8 15.0 0.873 93.0	14.306 3.60



## Receiving Check List

<http://www.teklabinc.com/>

Client: Barr Engineering Company

Work Order: 13010451

Client Project: Rivermines NPDES

Report Date: 17-Jan-13

Carrier: Neil Talbott

Received By: SRH

Completed by:

On:

10-Jan-13

Timothy W. Mathis

Reviewed by:

On:

10-Jan-13

Michael L. Austin

Pages to follow: Chain of custody

1

Extra pages included

0

Shipping container/cooler in good condition?

Yes

No

Not Present

Temp °C 1.2

Type of thermal preservation?

None

Ice

Blue Ice

Dry Ice

Chain of custody present?

Yes

No

Chain of custody signed when relinquished and received?

Yes

No

Chain of custody agrees with sample labels?

Yes

No

Samples in proper container/bottle?

Yes

No

Sample containers intact?

Yes

No

Sufficient sample volume for indicated test?

Yes

No

All samples received within holding time?

Yes

No

Reported field parameters measured:

Field

Lab

NA

Container/Temp Blank temperature in compliance?

Yes

No

*When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.*

Water – at least one vial per sample has zero headspace?

Yes

No

No VOA vials

Water - TOX containers have zero headspace?

Yes

No

No TOX containers

Water - pH acceptable upon receipt?

Yes

No

NPDES/CWA TCN interferences checked/treated in the field?

Yes

No

NA

Any No responses must be detailed below or on the COC.



### Chain of Custody

*1001 Diamond Ridge, Suite 1100  
Jefferson City, MO 65109  
(573) 638-5000*

Project Number: 25860009.00 TLM 02 |

Project Name: Rivermines NPDES

Sample Origination State: MO (use two letter postal state abbreviation)

COC Number: RMP 010913

Comments: Invoice to Mark Nations at Doc Run. Results to be sent to Allison Olds ([aolds@barr.com](mailto:aolds@barr.com)) at Barr Engineering, Andrea Nord ([anord@barr.com](mailto:anord@barr.com)) at Barr Engineering, and Mark Nations ([mnations@docrun.com](mailto:mnations@docrun.com)) at Doc Run.

Matrix is surface water.  
Metals include Cadmium

Metals include Cadmium, Lead, and Zinc.

<b>Common Parameter/Container – Preservation Key</b>		<b>Relinquished By:</b> Stephen Moilanen	<b>On Ice?</b> <input checked="" type="checkbox"/> Y <input type="checkbox"/> N	<b>Date:</b> 1-9-13	<b>Time:</b> 14:30	<b>Received by:</b> Mark Hayes	<b>Date:</b> 1/10/13	<b>Time:</b> 10:00
#1 - Volatile Organics = BTEX, GRO, TPH, 8260 Full List		<b>Relinquished By:</b> Mark Hayes	<b>On Ice?</b> <input checked="" type="checkbox"/> Y <input type="checkbox"/> N	<b>Date:</b> 1/10/13	<b>Time:</b> 11:27	<b>Received by:</b> Mark Hayes	<b>Date:</b> 1/10/13	<b>Time:</b> 11:27
#2 - Semivolatile Organics = PAHs, PCP, Dioxins, 8270 Full List, Herbicide/Pesticide, PCBs		<b>Samples Shipped VIA:</b> <input type="checkbox"/> Air Freight <input type="checkbox"/> Federal Express <input type="checkbox"/> Sampler <input checked="" type="checkbox"/> Other: Courier Pickup			<b>Air Bill Number:</b> 1-2 BCE PRE-V TM 1-10-13			
#3 - General - pH, Chloride, Fluoride, Alkalinity, TSS, TDS, TS, Sulfate								
#4 - Nutrients - COD, TOC, Phenols, Ammonia Nitrogen,								

Distribution: White – Original Accompanies Shipment to Lab; Yellow – Field Copy; Pink – Lab Coordinator

# THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	Turbidity
Date	Number		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	FAU
1/2/13	13-0027	RMP ROUGH T	3.0	9548^	ND	ND	631	26	1359^	166	809	7.36	1
		RMP ROUGH D		7735					1148				

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34



Quentin J. Schmidt Analytical Laboratory  
43 Iron County Road No 1 Bldg 3  
Viburnum, MO 65566  
(573) 244-8105

## SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

### METHOD BLANK

Associated Lab Samples: L13-0001-0027

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	ND	0.38	1/2/13	
Copper	ug/L	3.1	0.97	1/2/13	
Lead	ug/L	0.66	2.7	1/2/13	
Zinc	ug/L	ND	0.91	1/2/13	
Nickel	ug/L	ND	0.86	1/2/13	
Thallium	ug/L	ND	1.86	1/2/13	
Iron	ug/L	1.7	2.0	1/2/13	

### LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	489	98%	85-115%	
Copper	ug/L	500	544	109%	85-115%	
Lead	ug/L	500	485	97%	85-115%	
Zinc	ug/L	500	483	97%	85-115%	
Nickel	ug/L	500	475	95%	85-115%	
Iron	ug/L	500	433	87%	85-115%	

### MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 12-7814 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0.178	500	500	546	541	109%	108%	75-125%	
Copper	ug/L	0.44	500	500	552	558	110%	112%	75-125%	
Lead	ug/L	0	500	500	514	520	103%	104%	75-125%	
Zinc	ug/L	95	500	500	666	661	114%	113%	75-125%	
Nickel	ug/L	7.3	500	500	504	508	99%	100%	75-125%	
Iron	ug/L	14	500	500	431	461	83%	89%	75-125%	



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Viburnum, MO 65566  
(573) 244-8105

## QUALITY CONTROL DATA

### SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

METHOD BLANK

Associated Lab Samples: L13-0001-0027

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.87	5	1/3/13	

#### LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	100	95.3	95%	85-115%	

#### LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	100	93.4	93%	85-115%	

#### LABORATORY SAMPLE DUPLICATE 13-0027

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	166.1	169	102%	85-115%	

pH SM4500-H+F	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	6.96	6.95-7.05	L11-0002-0121
ICV Buffer 4.00	3.99	3.95-4.05	L12-0002-0046
ICV Buffer 10.01	9.96	9.96-10.06	L12-0002-0047
CCV Buffer 10.00	9.98	9.96-10.06	L11-0002-0122
CCV Buffer 4.05	3.98	3.95-4.05	L12-0002-0048

Slope 98.4% 90-102%



Quentin J. Schmidt Analytical Laboratory  
43 Iron County Road No 1 Bldg 3  
Viburnum, MO 65566  
(573) 244-8105

## QUALITY CONTROL DATA

### SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAPH 300.0

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METHOD BLANK MATRIX: Water

Associated Lab Samples: L13-0001-0027

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	1/3/13	

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### MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 13-0027 mg/l		8.1	4	11.6	88%	75-125	

---

### LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/l	5	4.4	88%	85-115	



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43 Iron County Road No 1 Bldg 3  
Viburnum, MO 65566  
(573) 244-8105

## QUALIFIERS

### SEMO PROJECT

#### DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
F	Filtered Samples prepared in the field.

#### ANALYTE QUALIFIERS

- H** Analysis conducted outside the EPA method holding time.  
**M** Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.  
**R** RPD value was outside control limits.

**NES** Not enough sample.

Method	Analysts
200.7	TLL
Alka	AH
IC	TLL

Report Acceptance	
QAO	Date
GWP	1/4/2013
Manager	Date
EJS	1/4/2013

# THE DOE RUN COMPANY

## SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	Turbidity
Date	Number		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	FAU
1/4/13	13-0104	RMP ROUGH T	9.6	10620^	14	0.34 J	676	36	3007^	177	854	7.42	1
		RMP ROUGH D		8175					1335				

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34



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Viburnum, MO 65566  
(573) 244-8105

## SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

### METHOD BLANK

Associated Lab Samples: L13-0001-0104

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	0.26	0.38	1/9/13	
Copper	ug/L	8.0	0.97	1/9/13	
Lead	ug/L	2.3	2.7	1/9/13	
Zinc	ug/L	ND	0.91	1/9/13	
Nickel	ug/L	ND	0.86	1/9/13	
Thallium	ug/L	7.0	1.86	1/9/13	
Iron	ug/L	14	2.0	1/9/13	

### LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	500	100%	85-115%	
Copper	ug/L	500	504	101%	85-115%	
Lead	ug/L	500	503	101%	85-115%	
Zinc	ug/L	500	500	100%	85-115%	
Nickel	ug/L	500	496	99%	85-115%	
Iron	ug/L	500	471	94%	85-115%	

### MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 13-0104 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0.28	500	500	499	485	100%	97%	75-125%	
Copper	ug/L	0.93	500	500	517	506	103%	101%	75-125%	
Lead	ug/L	3.8	500	500	496	488	98%	97%	75-125%	
Zinc	ug/L	106	500	500	599	579	99%	95%	75-125%	
Nickel	ug/L	7.1	500	500	497	480	98%	95%	75-125%	
Iron	ug/L	30	500	500	495	464	93%	87%	75-125%	



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Viburnum, MO 65566  
(573) 244-8105

## QUALITY CONTROL DATA

### SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

#### METHOD BLANK

Associated Lab Samples: L13-0001-0104

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.97	5	1/9/13	

#### LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	100	98.6	99%	85-115%	

#### LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	100	97.1	97%	85-115%	

#### LABORATORY SAMPLE DUPLICATE 13-0104

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	176.5	176	100%	85-115%	

pH SM4500-H+E	Results	QC Limits	Lab Standard Number
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ICV Buffer 7.00	6.96	6.95-7.05	L11-0002-0121
ICV Buffer 4.00	4.02	3.95-4.05	L12-0002-0046
ICV Buffer 10.01	10.06	9.96-10.06	L12-0002-0047
CCV Buffer 10.00	10.06	9.96-10.06	L11-0002-0122
CCV Buffer 4.05	4.02	3.95-4.05	L12-0002-0048

Slope 98.7% 90-102%



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(573) 244-8105

### QUALITY CONTROL DATA

#### SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAPH 300.0

---

METHOD BLANK      MATRIX: Water

Associated Lab Samples: L13-0001-0104

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	2/7/13	

---

#### MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 13-0104	mg/l	8.5	4	12	88%	75-125	

---

#### LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec	Limits	Qualifiers
Sulfate	mg/l	5	4.4	88%	88%	85-115	



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Viburnum, MO 65566  
(573) 244-8105

## QUALIFIERS

### SEMO PROJECT

#### DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
Filterd	Filtered Samples prepared in the field.

#### ANALYTE QUALIFIERS

- H Analysis conducted outside the EPA method holding time.  
M Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.  
R RPD value was outside control limits.

NES Not enough sample.

Method	Analysts
200.7	TLL
Alka	MKM
IC	TLL

Report Acceptance	
QAO	Date
GWP	1/11/2013
Manager	Date
EJS	1/11/2013

# THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	Turbidity
Date	Number		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	FAU
1/7/13	13-0144	RMP ROUGH T	4.8	13080^	8.6	0.57	687	32	2236^	178	795	7.4	5
		RMP ROUGH D		11120^					1429				

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34



Quentin J. Schmidt Analytical Laboratory  
43 Iron County Road No 1 Bldg 3  
Viburnum, MO 65566  
(573) 244-8105

## SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

### METHOD BLANK

Associated Lab Samples: L13-0001-0144

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	0.15	0.38	1/9/13	
Copper	ug/L	ND	0.97	1/9/13	
Lead	ug/L	2.2	2.7	1/9/13	
Zinc	ug/L	ND	0.91	1/9/13	
Nickel	ug/L	ND	0.86	1/9/13	
Thallium	ug/L	3.7	1.86	1/9/13	
Iron	ug/L	16	2.0	1/9/13	

### LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	499	100%	85-115%	
Copper	ug/L	500	535	107%	85-115%	
Lead	ug/L	500	498	100%	85-115%	
Zinc	ug/L	500	495	99%	85-115%	
Nickel	ug/L	500	491	98%	85-115%	
Iron	ug/L	500	480	96%	85-115%	

### MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 13-0144 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0.28	500	500	538	548	108%	110%	75-125%	
Copper	ug/L	0.12	500	500	531	540	106%	108%	75-125%	
Lead	ug/L	2.6	500	500	505	517	100%	103%	75-125%	
Zinc	ug/L	131	500	500	670	677	108%	109%	75-125%	
Nickel	ug/L	8.5	500	500	498	509	98%	100%	75-125%	
Iron	ug/L	22	500	500	485	492	93%	94%	75-125%	



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Viburnum, MO 65566  
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## QUALITY CONTROL DATA

### SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

#### METHOD BLANK

Associated Lab Samples: L13-0001-0144

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.97	5	1/9/13	

#### LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	100	98.6	99%	85-115%	

#### LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	100	97.1	97%	85-115%	

#### LABORATORY SAMPLE DUPLICATE 13-0144

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	178.5	177.5	99%	85-115%	

pH SM4500-H+E	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	6.96	6.95-7.05	L11-0002-0121
ICV Buffer 4.00	4.02	3.95-4.05	L12-0002-0046
ICV Buffer 10.01	10.06	9.96-10.06	L12-0002-0047
CCV Buffer 10.00	10.06	9.96-10.06	L11-0002-0122
CCV Buffer 4.05	4.02	3.95-4.05	L12-0002-0048

Slope 98.7% 90-102%



Quentin J. Schmidt Analytical Laboratory  
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Viburnum, MO 65566  
(573) 244-8105

## QUALITY CONTROL DATA

### SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAPH 300.0

---

METHOD BLANK MATRIX: Water

Associated Lab Samples: L13-0001-0144

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	1/7/13	

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### MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 13-0144 mg/l		7.9	4	11.5	90%	75-125	

---

### LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec	Limits	Qualifiers
Sulfate	mg/l	5	4.4	88%	85-115		



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43 Iron County Road No 1 Bldg 3  
Viburnum, MO 65566  
(573) 244-8105

## QUALIFIERS

### SEMO PROJECT

#### DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
✓	Filtered Samples prepared in the field.

#### ANALYTE QUALIFIERS

- H** Analysis conducted outside the EPA method holding time.  
**M** Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.  
**R** RPD value was outside control limits.

**NES** Not enough sample.

Method	Analysts
200.7	TLL
Alka	AH
IC	TLL

Report Acceptance	
QAO	Date
GWP	1/11/2013
Manager	Date
EJS	1/11/2013

# THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	Turbidity	TSS
Date	Number		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	FAU	mg/l
1/9/13	13-0196	RMP ROUGH T	4.7	12710^	ND	ND	674	30	2217^	183	830	7.21	ND	5
		RMP ROUGH D		11190^					1589^					

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34



Quentin J. Schmidt Analytical Laboratory  
43 Iron County Road No 1 Bldg 3  
Viburnum, MO 65566  
(573) 244-8105

## SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

### METHOD BLANK

Associated Lab Samples: L13-0001-0196

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	ND	0.38	1/9/13	
Copper	ug/L	ND	0.97	1/9/13	
Lead	ug/L	0.25	2.7	1/9/13	
Zinc	ug/L	ND	0.91	1/9/13	
Nickel	ug/L	ND	0.86	1/9/13	
Thallium	ug/L	ND	1.86	1/9/13	
Iron	ug/L	.74	2.0	1/9/13	

### LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	491	98%	85-115%	
Copper	ug/L	500	506	101%	85-115%	
Lead	ug/L	500	491	98%	85-115%	
Zinc	ug/L	500	492	98%	85-115%	
Nickel	ug/L	500	495	99%	85-115%	
Iron	ug/L	500	505	101%	85-115%	

### MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 13-0196 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0	500	500	536	527	107%	105%	75-125%	
Copper	ug/L	0	500	500	511	507	102%	101%	75-125%	
Lead	ug/L	0.56	500	500	500	491	100%	98%	75-125%	
Zinc	ug/L	127	500	500	668	656	108%	106%	75-125%	
Nickel	ug/L	8.1	500	500	503	498	99%	98%	75-125%	
Iron	ug/L	2.2	500	500	526	517	105%	103%	75-125%	



Quentin J. Schmidt Analytical Laboratory  
43 Iron County Road No 1 Bldg 3  
Viburnum, MO 65566  
(573) 244-8105

## QUALITY CONTROL DATA

### SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

#### METHOD BLANK

Associated Lab Samples: L13-0001-0196

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.97	5	1/9/13	

LABORATORY CONTROL SAMPLE						
Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	100	98.6	99%	85-115%	

LABORATORY CONTROL SAMPLE DUPLICATE						
Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	100	97.1	97%	85-115%	

LABORATORY SAMPLE DUPLICATE 13-0196						
Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	183.4	181.9	99%	85-115%	

pH SM4500-H+E	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	6.96	6.95-7.05	L11-0002-0121
ICV Buffer 4.00	4.02	3.95-4.05	L12-0002-0046
ICV Buffer 10.01	10.06	9.96-10.06	L12-0002-0047
CCV Buffer 10.00	10.06	9.96-10.06	L11-0002-0122
CCV Buffer 4.05	4.02	3.95-4.05	L12-0002-0048

Slope 98.7% 90-102%



Quentin J. Schmidt Analytical Laboratory  
43 Iron County Road No 1 Bldg 3  
Viburnum, MO 65566  
(573) 244-8105

## QUALITY CONTROL DATA

### SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAF 300.0

---

METHOD BLANK

MATRIX: Water

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	1/10/13	

---

### MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 13-0196	mg/l	8.3	4	11.7	85%	75-125	

---

### LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec	Limits	Qualifiers
Sulfate	mg/l	5	4.5	90%	85-115		



Quentin J. Schmidt Analytical Laboratory  
43 Iron County Road No 1 Bldg 3  
Viburnum, MO 65566  
(573) 244-8105

## QUALITY CONTROL DATA

### SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM2540D

ANALYSIS DESCRIPTION: 2540D Total Suspended Solids

---

METHOD BLANK MATRIX: Water

Associated Lab Samples: L13-0001-0196

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solid	mg/l	ND	5	1/10/13	

#### LABORATORY DUPLICATE

SAMPLE NUMBER / NAME: 13-0196

Parameter	Units	Results	Dup Results	Qual
Total Suspended Solid	mg/l	5	4.5	

#### LABORATORY CONTROL SAMPLE L12-0002-0103

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/l	5	5	100%	85-115	

#### LABORATORY CONTROL SAMPLE L12-0002-0103



Quentin J. Schmidt Analytical Laboratory  
43 Iron County Road No 1 Bldg 3  
Viburnum, MO 65566  
(573) 244-8105

## QUALIFIERS

### SEMO PROJECT

#### DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
Filter	Filtered Samples prepared in the field.

#### ANALYTE QUALIFIERS

- H Analysis conducted outside the EPA method holding time.  
M Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.  
R RPD value was outside control limits.

NES Not enough sample.

Method	Analysts
200.7	TLL
Alka	AH
IC	TLL

Report Acceptance	
QAO	Date
GWP	1/14/2013
Manager	Date
EJS	1/14/2013

# THE DOE RUN COMPANY

## SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	Turbidity
Date	Number		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	FAU
1/11/13	13-0239	RMP ROUGH T	2.8	10540^	ND	0.19 J	550	25	1410	172	802	7.5	ND
		RMP ROUGH D		10180^					1367				

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34



Quentin J. Schmidt Analytical Laboratory  
43 Iron County Road No 1 Bldg 3  
Viburnum, MO 65566  
(573) 244-8105

## SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

### METHOD BLANK

Associated Lab Samples: L13-0001-0239

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	ND	0.38	1/11/13	
Copper	ug/L	ND	0.97	1/11/13	
Lead	ug/L	ND	2.7	1/11/13	
Zinc	ug/L	ND	0.91	1/11/13	
Nickel	ug/L	ND	0.86	1/11/13	
Thallium	ug/L	0.28	1.86	1/11/13	
Iron	ug/L	ND	2.0	1/11/13	

### LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	496	99%	85-115%	
Copper	ug/L	500	509	102%	85-115%	
Lead	ug/L	500	496	99%	85-115%	
Zinc	ug/L	500	498	100%	85-115%	
Nickel	ug/L	500	495	99%	85-115%	
Iron	ug/L	500	489	98%	85-115%	

### MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 13-0239 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0.04	500	500	525	524	105%	105%	75-125%	
Copper	ug/L	0	500	500	513	508	103%	102%	75-125%	
Lead	ug/L	0	500	500	484	485	97%	97%	75-125%	
Zinc	ug/L	105	500	500	644	643	108%	108%	75-125%	
Nickel	ug/L	6.5	500	500	484	481	96%	95%	75-125%	
Iron	ug/L	0.39	500	500	454	475	91%	95%	75-125%	



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## QUALITY CONTROL DATA

### SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

#### METHOD BLANK

Associated Lab Samples: L13-0001-0239

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.51	5	1/16/13	

#### LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	100	95.38	95%	85-115%	

#### LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	100	95.38	95%	85-115%	

#### LABORATORY SAMPLE DUPLICATE 13-0239

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	172.09	172.6	100%	85-115%	

pH SM4500-H+f	Results	QC Limits	Lab Standard Number
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ICV Buffer 7.00	6.98	6.95-7.05	L11-0002-0121
ICV Buffer 4.00	4.02	3.95-4.05	L12-0002-0046
ICV Buffer 10.01	9.98	9.96-10.06	L12-0002-0047
CCV Buffer 10.00	10.03	9.96-10.06	L11-0002-0122

Slope	93.6%	90-102%
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## QUALITY CONTROL DATA

### SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAF 300.0

METHOD BLANK      MATRIX: Water

Associated Lab Samples: L13-0001-0239

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	1/11/13	

### MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 13-0239	mg/l	8	4	11.3	83%	75-125	

### LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec	Limits	Qualifiers
Sulfate	mg/l	5	4.3	86%	85-115		



## QUALIFIERS

Quentin J. Schmidt Analytical Laboratory  
43 Iron County Road No 1 Bldg 3  
Viburnum, MO 65566  
(573) 244-8105

## SEMO PROJECT

### DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
Filterd	Filtered Samples prepared in the field.

### ANALYTE QUALIFIERS

- H** Analysis conducted outside the EPA method holding time.
- M** Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
- R** RPD value was outside control limits.

**NES** Not enough sample.

Method	Analysts
200.7	TLL
Alka	MKM
IC	TLL

Report Acceptance	
QAO	Date
GWP	1/17/2013
Manager	Date
EJS	1/17/2013

# THE DOE RUN COMPANY

## SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	Turbidity
Date	Number		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	FAU
1/14/13	13-0269	RMP ROUGH T	4.9	10120^	2.2	0.19 J	515	23	1129	176	635	7.07	2
		RMP ROUGH D		9771^					1088				

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34



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(573) 244-8105

## SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

### METHOD BLANK

Associated Lab Samples: L13-0001-0269

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	0.04	0.38	1/15/13	
Copper	ug/L	ND	0.97	1/15/13	
Lead	ug/L	0.42	2.7	1/15/13	
Zinc	ug/L	1.8	0.91	1/15/13	
Nickel	ug/L	0.009	0.86	1/15/13	
Thallium	ug/L	ND	1.86	1/15/13	
Iron	ug/L	ND	2.0	1/15/13	

### LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	500	100%	85-115%	
Copper	ug/L	500	522	104%	85-115%	
Lead	ug/L	500	504	101%	85-115%	
Zinc	ug/L	500	500	100%	85-115%	
Nickel	ug/L	500	499	100%	85-115%	
Iron	ug/L	500	486	97%	85-115%	

### MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 13-0269 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0.13	500	500	546	560	109%	112%	75-125%	
Copper	ug/L	0	500	500	532	552	106%	110%	75-125%	
Lead	ug/L	3.3	500	500	508	516	101%	103%	75-125%	
Zinc	ug/L	101	500	500	654	670	111%	114%	75-125%	
Nickel	ug/L	6.1	500	500	495	510	98%	101%	75-125%	
Iron	ug/L	14	500	500	473	486	92%	94%	75-125%	



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## QUALITY CONTROL DATA

### SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

#### METHOD BLANK

Associated Lab Samples: L13-0001-0269

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.51	5	1/16/13	

#### LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	100	95.38	95%	85-115%	

#### LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	100	95.38	95%	85-115%	

#### LABORATORY SAMPLE DUPLICATE 13-0269

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	176.13	175.12	99%	85-115%	

#### pH SM4500-H+E

Results	QC Limits	Lab Standard Number
ICV Buffer 7.00 6.98	6.95-7.05	L11-0002-0121
ICV Buffer 4.00 4.02	3.95-4.05	L12-0002-0046
ICV Buffer 10.01 9.98	9.96-10.06	L12-0002-0047
CCV Buffer 10.00 10.06	9.96-10.06	L11-0002-0122

Slope 93.6% 90-102%



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## QUALITY CONTROL DATA

### SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAPH 300.0

---

METHOD BLANK MATRIX: Water

Associated Lab Samples: L13-0001-0269

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	1/14/13	

---

### MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 13-0269	mg/l	6.3	4	9.9	90%	75-125	

---

### LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec	Limits	Qualifiers
Sulfate	mg/l	4	3.9	98%	85-115		



Quentin J. Schmidt Analytical Laboratory

43 Iron County Road No 1 Bldg 3

Viburnum, MO 65566

(573) 244-8105

**QUALIFIERS****SEMO PROJECT****DEFINITIONS**

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
FF	Filtered Samples prepared in the field.

**ANALYTE QUALIFIERS**

- H** Analysis conducted outside the EPA method holding time.  
**M** Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.  
**R** RPD value was outside control limits.

**NES** Not enough sample.

Method	Analysts
200.7	TLL
Alka	MKM
IC	TLL

Report Acceptance	
QAO	Date
GWP	1/17/2013
Manager	Date
EJS	1/17/2013

# THE DOE RUN COMPANY

## SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	Turbidity
Date	Number		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	FAU
1/16/13	13-0357	RMP ROUGH T	2.1 J	9323^	11.3	0.15 J	574	25	1054	190	721	7.78	1
		RMP ROUGH D		9468^***					1033				

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34



Quentin J. Schmidt Analytical Laboratory  
43 Iron County Road No 1 Bldg 3  
Viburnum, MO 65566  
(573) 244-8105

## SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

### METHOD BLANK

Associated Lab Samples: L13-0001-0357

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	ND	0.38	1/17/13	
Copper	ug/L	1.4	0.97	1/17/13	
Lead	ug/L	ND	2.7	1/17/13	
Zinc	ug/L	ND	0.91	1/17/13	
Nickel	ug/L	0.19	0.86	1/17/13	
Thallium	ug/L	ND	1.86	1/17/13	
Iron	ug/L	ND	2.0	1/17/13	

### LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	548	110%	85-115%	
Copper	ug/L	500	550	110%	85-115%	
Lead	ug/L	500	545	109%	85-115%	
Zinc	ug/L	500	549	110%	85-115%	
Nickel	ug/L	500	546	109%	85-115%	
Iron	ug/L	500	543	109%	85-115%	

### MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 13-0357 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0	500	500	551	542	110%	108%	75-125%	
Copper	ug/L	0	500	500	568	559	114%	112%	75-125%	
Lead	ug/L	0	500	500	547	538	109%	108%	75-125%	
Zinc	ug/L	93	500	500	646	635	111%	108%	75-125%	
Nickel	ug/L	6.7	500	500	551	542	109%	107%	75-125%	
Iron	ug/L	9.6	500	500	550	521	108%	102%	75-125%	



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## QUALITY CONTROL DATA

### SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

#### METHOD BLANK

Associated Lab Samples: L13-0001-0357

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.1	5	1/24/13	

#### LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	100	102.63	103%	85-115%	

#### LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	100	100.98	101%	85-115%	

#### LABORATORY SAMPLE DUPLICATE 13-0357

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	189.9	188.8	99%	85-115%	

pH SM4500-H+F	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	6.97	6.95-7.05	L11-0002-0121
ICV Buffer 4.00	4.02	3.95-4.05	L12-0002-0046
ICV Buffer 10.01	10.04	9.96-10.06	L12-0002-0047
CCV Buffer 10.00	10.01	9.96-10.06	L11-0002-0122
CCV Buffer 4.05	4.05	3.95-4.05	L12-0002-0048
Slope	95.1%	90-102%	



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## QUALITY CONTROL DATA

### SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAPH 300.0

---

METHOD BLANK      MATRIX: Water

Associated Lab Samples: L13-0001-0357

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	1/17/13	

---

### MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 13-0357	mg/l	7.2	4	11.3	103%	75-125	

---

### LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/l	5	4.4	88%	85-115	



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Viburnum, MO 65566  
(573) 244-8105

## QUALIFIERS

### SEMO PROJECT

#### DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
Filter	Filtered Samples prepared in the field.

#### ANALYTE QUALIFIERS

- H** Analysis conducted outside the EPA method holding time.  
**M** Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.  
**R** RPD value was outside control limits.

**NES** Not enough sample.

Method	Analysts
200.7	TLL
Alka	MKM
IC	TLL

Report Acceptance	
QAO	Date
GWP	1/25/2013
Manager	Date
EJS	1/25/2013

THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	Turbidity
Date	Number		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	FAU
1/18/13	13-0384	RMP ROUGH T	3.1	10640^	2.4	0.22 J	577	26	1063	181	783	7.28	1
		RMP ROUGH D		10280^					1015				

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34



Quentin J. Schmidt Analytical Laboratory  
43 Iron County Road No 1 Bldg 3  
Viburnum, MO 65566  
(573) 244-8105

## SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

### METHOD BLANK

Associated Lab Samples: L13-0001-03847

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	0.01	0.38	1/18/13	
Copper	ug/L	3.8	0.97	1/18/13	
Lead	ug/L	ND	2.7	1/18/13	
Zinc	ug/L	ND	0.91	1/18/13	
Nickel	ug/L	ND	0.86	1/18/13	
Thallium	ug/L	0.01	1.86	1/18/13	
Iron	ug/L	ND	2.0	1/18/13	

### LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	478	96%	85-115%	
Copper	ug/L	500	484	97%	85-115%	
Lead	ug/L	500	477	95%	85-115%	
Zinc	ug/L	500	481	96%	85-115%	
Nickel	ug/L	500	483	97%	85-115%	
Iron	ug/L	500	490	98%	85-115%	

### MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 13-0384 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0.06	500	500	491	523	98%	105%	75-125%	
Copper	ug/L	0	500	500	611	519	122%	104%	75-125%	
Lead	ug/L	0	500	500	452	488	90%	98%	75-125%	
Zinc	ug/L	106	500	500	591	639	97%	107%	75-125%	
Nickel	ug/L	7.2	500	500	452	498	89%	98%	75-125%	
Iron	ug/L	17	500	500	490	508	95%	98%	75-125%	



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(573) 244-8105

## QUALITY CONTROL DATA

### SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

METHOD BLANK

Associated Lab Samples: L13-0001-0384

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.1	5	1/24/13	

#### LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	100	102.63	103%	85-115%	

#### LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	100	100.98	101%	85-115%	

#### LABORATORY SAMPLE DUPLICATE 13-0384

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	180.6	183.3	101%	85-115%	

pH SM4500-H+E	Results	QC Limits	Lab Standard Number
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ICV Buffer 7.00	6.97	6.95-7.05	L11-0002-0121
ICV Buffer 4.00	4.02	3.95-4.05	L12-0002-0046
ICV Buffer 10.01	10.04	9.96-10.06	L12-0002-0047
CCV Buffer 10.00	10.01	9.96-10.06	L11-0002-0122
CCV Buffer 4.05	4.05	3.95-4.05	L12-0002-0048

Slope 95.1% 90-102%



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43 Iron County Road No 1 Bldg 3  
Viburnum, MO 65566  
(573) 244-8105

## QUALITY CONTROL DATA

### SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAPH 300.0

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METHOD BLANK      MATRIX: Water

Associated Lab Samples: L13-0001-0384

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	1/18/13	

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### MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 13-0384	mg/l	7.8	4	11.4	90%	75-125	

---

### LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec	Limits	Qualifiers
Sulfate	mg/l	5	4.4	88%	85-115		



Quentin J. Schmidt Analytical Laboratory  
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Viburnum, MO 65566  
(573) 244-8105

## QUALIFIERS

### SEMO PROJECT

#### DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
Filter	Filtered Samples prepared in the field.

#### ANALYTE QUALIFIERS

- H** Analysis conducted outside the EPA method holding time.  
**M** Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.  
**R** RPD value was outside control limits.

**NES** Not enough sample.

Method	Analysts
200.7	TLL
Alka	MKM
IC	TLL

Report Acceptance	
QAO	Date
GWP	1/25/2013
Manager	Date
EJS	1/25/2013

THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	Turbidity
Date	Number		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	FAU
1/21/13	13-0429	RMP ROUGH T	5.1	10510^	ND	0.15 J	577	25	1095	187	808	7.15	1
		RMP ROUGH D		9879^					1036				

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34



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## SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

### METHOD BLANK

Associated Lab Samples: L13-0001-0429

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	ND	0.38	1/21/13	
Copper	ug/L	ND	0.97	1/21/13	
Lead	ug/L	1.2	2.7	1/21/13	
Zinc	ug/L	ND	0.91	1/21/13	
Nickel	ug/L	0.26	0.86	1/21/13	
Thallium	ug/L	ND	1.86	1/21/13	
Iron	ug/L	5.5	2.0	1/21/13	

### LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	480	96%	85-115%	
Copper	ug/L	500	481	96%	85-115%	
Lead	ug/L	500	481	96%	85-115%	
Zinc	ug/L	500	484	97%	85-115%	
Nickel	ug/L	500	485	97%	85-115%	
Iron	ug/L	500	491	98%	85-115%	

### MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 13-0429 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0	500	500	505	503	101%	101%	75-125%	
Copper	ug/L	0	500	500	490	480	98%	96%	75-125%	
Lead	ug/L	0.94	500	500	468	466	93%	93%	75-125%	
Zinc	ug/L	105	500	500	617	613	102%	102%	75-125%	
Nickel	ug/L	6.9	500	500	471	472	93%	93%	75-125%	
Iron	ug/L	17	500	500	470	471	91%	91%	75-125%	



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## QUALITY CONTROL DATA

### SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

#### METHOD BLANK

Associated Lab Samples: L13-0001-0429

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.1	5	1/24/13	

#### LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	100	102.63	103%	85-115%	

#### LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	100	100.98	101%	85-115%	

#### LABORATORY SAMPLE DUPLICATE 13-0429

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	186.6	190	102%	85-115%	

pH SM4500-H+F	Results	QC Limits	Lab Standard Number
---------------	---------	-----------	---------------------

ICV Buffer 7.00	6.97	6.95-7.05	L11-0002-0121
ICV Buffer 4.00	4.02	3.95-4.05	L12-0002-0046
ICV Buffer 10.01	10.04	9.96-10.06	L12-0002-0047
CCV Buffer 10.00	10.01	9.96-10.06	L11-0002-0122
CCV Buffer 4.05	4.05	3.95-4.05	L12-0002-0048

Slope	95.1%	90-102%
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## QUALITY CONTROL DATA

### SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAF 300.0

---

METHOD BLANK      MATRIX: Water

Associated Lab Samples: L13-0001-0429

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	1/21/13	

---

### MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 13-0429	mg/l	8.1	4	12	98%	75-125	

---

### LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec	Limits	Qualifiers
Sulfate	mg/l	5	4.4	88%	88%	85-115	



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(573) 244-8105

## QUALIFIERS

### SEMO PROJECT

#### DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
Λ	1/100 Dilution
FSF	Filtered Samples prepared in the field.

#### ANALYTE QUALIFIERS

- H** Analysis conducted outside the EPA method holding time.  
**M** Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.  
**R** RPD value was outside control limits.

**NES** Not enough sample.

Method	Analysts
200.7	TLL
Alka	AMM
IC	TLL

Report Acceptance	
QAO	Date
GWP	1/25/2013
Manager	Date
EJS	1/25/2013

# THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	Turbidity
Date	Number		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	FAU
1/23/13	13-0466	RMP ROUGH T	3.6	11710^	1.4	0.14 J	632	28	1135^	180	8	7.16	6
		RMP ROUGH D		11190^					1044				

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34



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## SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

### METHOD BLANK

Associated Lab Samples: L13-0001-0466

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	ND	0.38	1/23/13	
Copper	ug/L	ND	0.97	1/23/13	
Lead	ug/L	0.99	2.7	1/23/13	
Zinc	ug/L	ND	0.91	1/23/13	
Nickel	ug/L	0.13	0.86	1/23/13	
Thallium	ug/L	ND	1.86	1/23/13	
Iron	ug/L	ND	2.0	1/23/13	

### LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	481	96%	85-115%	
Copper	ug/L	500	475	95%	85-115%	
Lead	ug/L	500	480	96%	85-115%	
Zinc	ug/L	500	483	97%	85-115%	
Nickel	ug/L	500	486	97%	85-115%	
Iron	ug/L	500	498	100%	85-115%	

### MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 13-0466 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0	500	500	549	529	110%	106%	75-125%	
Copper	ug/L	0	500	500	519	494	104%	99%	75-125%	
Lead	ug/L	0.4	500	500	509	486	102%	97%	75-125%	
Zinc	ug/L	117	500	500	681	654	113%	107%	75-125%	
Nickel	ug/L	7.7	500	500	513	493	101%	97%	75-125%	
Iron	ug/L	11.4	500	500	511	502	100%	98%	75-125%	



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## QUALITY CONTROL DATA

### SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

#### METHOD BLANK

Associated Lab Samples: L13-0001-0466

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.1	5	1/24/13	

#### LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	100	102.63	103%	85-115%	

#### LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	100	100.98	101%	85-115%	

#### LABORATORY SAMPLE DUPLICATE 13-0466

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	180.01	182.2	101%	85-115%	

pH SM4500-H+F	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	6.97	6.95-7.05	L11-0002-0121
ICV Buffer 4.00	4.02	3.95-4.05	L12-0002-0046
ICV Buffer 10.01	10.04	9.96-10.06	L12-0002-0047
CCV Buffer 10.00	10.01	9.96-10.06	L11-0002-0122
CCV Buffer 4.05	4.05	3.95-4.05	L12-0002-0048

Slope 95.1% 90-102%



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## QUALITY CONTROL DATA

### SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAPH 300.0

---

METHOD BLANK MATRIX: Water

Associated Lab Samples: L13-0001-0466

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	1/23/13	

---

### MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 13-0466 mg/l		7.9	4	11.5	90%	75-125	

---

### LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec	Limits	Qualifiers
Sulfate	mg/l	5	4.4	88%	85-115		



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Viburnum, MO 65566  
(573) 244-8105

## QUALIFIERS

### SEMO PROJECT

#### DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
FS	Filtered Samples prepared in the field.

#### ANALYTE QUALIFIERS

- H Analysis conducted outside the EPA method holding time.  
M Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.  
R RPD value was outside control limits.

NES Not enough sample.

Method	Analysts
200.7	TLL
Alka	AMM
IC	TLL

Report Acceptance	
QAO	Date
GWP	1/25/2013
Manager	Date
EJS	1/25/2013

# THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	Turbidity
Date	Number		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	FAU
1/25/13	13-0558	RMP ROUGH T	1.7	9686^	ND	0.42	630	25	1051	165	815	7.25	1
		RMP ROUGH D		9992^***					1097^***				

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34



Quentin J. Schmidt Analytical Laboratory  
43 Iron County Road No 1 Bldg 3  
Viburnum, MO 65566  
(573) 244-8105

## SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

### METHOD BLANK

Associated Lab Samples: L13-0001-0558

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	0.04	0.38	1/25/13	
Copper	ug/L	ND	0.97	1/25/13	
Lead	ug/L	ND	2.7	1/25/13	
Zinc	ug/L	0.17	0.91	1/25/13	
Nickel	ug/L	0.001	0.86	1/25/13	
Thallium	ug/L	ND	1.86	1/25/13	
Iron	ug/L	5.0	2.0	1/25/13	

### LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	494	99%	85-115%	
Copper	ug/L	500	495	99%	85-115%	
Lead	ug/L	500	495	99%	85-115%	
Zinc	ug/L	500	493	99%	85-115%	
Nickel	ug/L	500	487	97%	85-115%	
Iron	ug/L	500	473	95%	85-115%	

### MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 13-0558 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0.11	500	500	493	492	99%	98%	75-125%	
Copper	ug/L	0	500	500	520	517	104%	103%	75-125%	
Lead	ug/L	0	500	500	492	491	98%	98%	75-125%	
Zinc	ug/L	97	500	500	580	580	97%	97%	75-125%	
Nickel	ug/L	7.3	500	500	478	481	94%	95%	75-125%	
Iron	ug/L	7.4	500	500	442	444	87%	87%	75-125%	



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## QUALITY CONTROL DATA

### SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

#### METHOD BLANK

Associated Lab Samples: L13-0001-0558

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.92	5	2/1/13	

LABORATORY CONTROL SAMPLE							
Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers	
Alkalinity	mg/L CaCO <sub>3</sub>	100	100.3	100%	85-115%		

LABORATORY CONTROL SAMPLE DUPLICATE							
Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers	
Alkalinity	mg/L CaCO <sub>3</sub>	100	98.3	98%	85-115%		

LABORATORY SAMPLE DUPLICATE 13-0558							
Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers	
Alkalinity	mg/L CaCO <sub>3</sub>	165.3	167.3	101%	85-115%		

pH SM4500-H+E	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	7.00	6.95-7.05	L11-0002-0121
ICV Buffer 4.00	4.02	3.95-4.05	L12-0002-0046
ICV Buffer 10.01	10.04	9.96-10.06	L12-0002-0047
CCV Buffer 10.00	10.06	9.96-10.06	L11-0002-0122
CCV Buffer 4.05	3.99	3.95-4.05	L12-0002-0048
Slope	98.0%	90-102%	



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## QUALITY CONTROL DATA

### SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAF 300.0

---

METHOD BLANK      MATRIX: Water

Associated Lab Samples: L13-0001-0558

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	1/25/13	

---

### MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 13-0558	mg/l	8.2	4	11.8	90%	75-125	

---

### LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/l	5	4.3	86%	85-115	



## QUALIFIERS

Quentin J. Schmidt Analytical Laboratory  
43 Iron County Road No 1 Bldg 3  
Viburnum, MO 65566  
(573) 244-8105

## SEMO PROJECT

### DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
[ ]	Filtered Samples prepared in the field.

### ANALYTE QUALIFIERS

- H** Analysis conducted outside the EPA method holding time.  
**M** Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.  
**R** RPD value was outside control limits.

**NES** Not enough sample.

Method	Analysts
200.7	TLL
Alka	AMM
IC	TLL

Report Acceptance	
QAO	Date
GWP	2/1/2013
Manager	Date
EJS	2/1/2013

# THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	Turbidity
Date	Number		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	FAU	
1/30/13	13-0615	RMP ROUGH T	1.8 J	10330^	ND	0.28 J	823	24	1098	185	723	7.17	5
		RMP ROUGH D		10120^					1051				

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34



Quentin J. Schmidt Analytical Laboratory  
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## SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

### METHOD BLANK

Associated Lab Samples: L13-0001-0615

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	0.03	0.38	1/31/13	
Copper	ug/L	ND	0.97	1/31/13	
Lead	ug/L	ND	2.7	1/31/13	
Zinc	ug/L	ND	0.91	1/31/13	
Nickel	ug/L	ND	0.86	1/31/13	
Thallium	ug/L	ND	1.86	1/31/13	
Iron	ug/L	0.73	2.0	1/31/13	

### LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	494	99%	85-115%	
Copper	ug/L	500	491	98%	85-115%	
Lead	ug/L	500	492	98%	85-115%	
Zinc	ug/L	500	486	97%	85-115%	
Nickel	ug/L	500	487	97%	85-115%	
Iron	ug/L	500	474	95%	85-115%	

### MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 13-0615 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0.15	500	500	545	542	109%	108%	75-125%	
Copper	ug/L	0	500	500	510	497	102%	99%	75-125%	
Lead	ug/L	0	500	500	498	496	100%	99%	75-125%	
Zinc	ug/L	103	500	500	659	656	111%	111%	75-125%	
Nickel	ug/L	9.9	500	500	493	490	97%	96%	75-125%	
Iron	ug/L	9.5	500	500	453	482	89%	95%	75-125%	



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Viburnum, MO 65566  
(573) 244-8105

## QUALITY CONTROL DATA

### SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

#### METHOD BLANK

Associated Lab Samples: L13-0001-0615

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.92	5	2/1/13	

#### LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	100	100.3	100%	85-115%	

#### LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	100	98.3	98%	85-115%	

#### LABORATORY SAMPLE DUPLICATE 13-0615

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO <sub>3</sub>	184.5	186.5	101%	85-115%	

pH SM4500-H+F	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	7.00	6.95-7.05	L11-0002-0121
ICV Buffer 4.00	4.02	3.95-4.05	L12-0002-0046
ICV Buffer 10.01	10.04	9.96-10.06	L12-0002-0047
CCV Buffer 10.00	10.06	9.96-10.06	L11-0002-0122
CCV Buffer 4.05	3.99	3.95-4.05	L12-0002-0048

Slope 98.0% 90-102%



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## QUALITY CONTROL DATA

### SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAF 300.0

METHOD BLANK MATRIX: Water

Associated Lab Samples: L13-0001-0615

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	1/30/13	

### MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 13-0615	mg/l	7.2	9	15.9	97%	75-125	

### LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec	Limits	Qualifiers
Sulfate	mg/l	5	4.3	86%	85-115		



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## QUALIFIERS

### SEMO PROJECT

#### DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
F	Filtered Samples prepared in the field.

#### ANALYTE QUALIFIERS

- H Analysis conducted outside the EPA method holding time.  
M Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.  
R RPD value was outside control limits.  
NES Not enough sample.

Method	Analysts
200.7	TLL
Alka	AMM
IC	TLL

Report Acceptance	
QAO	Date
WP	2/1/2013
Manager	Date
EJS	2/1/2013